

#### 4.5.6 LTE Band 17

| LTE Band 17 Maximum Average Power (dBm) |      |        |              |       |       |                           |        |              |       |       |
|-----------------------------------------|------|--------|--------------|-------|-------|---------------------------|--------|--------------|-------|-------|
| Modulation                              | RB   |        | Test Channel |       |       | RB                        |        | Test Channel |       |       |
|                                         | Size | Offset | Low          | Mid   | High  | Size                      | Offset | Low          | Mid   | High  |
| Channel Bandwidth: 5 MHz                |      |        |              |       |       | Channel Bandwidth: 10 MHz |        |              |       |       |
| QPSK                                    | 1    | 0      | 21.65        | 21.92 | 21.78 | 1                         | 0      | 21.81        | 21.95 | 21.94 |
|                                         | 1    | 12     | 22.03        | 22.06 | 22.00 | 1                         | 24     | 22.06        | 22.22 | 22.08 |
|                                         | 1    | 24     | 21.85        | 21.99 | 21.86 | 1                         | 49     | 22.01        | 22.15 | 21.97 |
|                                         | 12   | 0      | 20.78        | 20.70 | 20.85 | 25                        | 0      | 20.98        | 20.84 | 20.87 |
|                                         | 12   | 6      | 20.72        | 21.55 | 21.42 | 25                        | 12     | 20.78        | 21.61 | 21.56 |
|                                         | 12   | 13     | 20.93        | 20.83 | 20.90 | 25                        | 25     | 20.95        | 20.99 | 21.07 |
|                                         | 25   | 0      | 20.86        | 21.55 | 21.47 | 50                        | 0      | 21.03        | 21.62 | 21.50 |
| 16QAM                                   | 1    | 0      | 21.04        | 20.79 | 20.80 | 1                         | 0      | 21.08        | 20.96 | 20.94 |
|                                         | 1    | 12     | 21.11        | 21.60 | 21.73 | 1                         | 24     | 21.18        | 21.64 | 21.83 |
|                                         | 1    | 24     | 20.28        | 20.75 | 20.80 | 1                         | 49     | 20.47        | 20.93 | 21.00 |
|                                         | 12   | 0      | 20.56        | 20.62 | 20.50 | 25                        | 0      | 20.68        | 20.72 | 20.52 |
|                                         | 12   | 6      | 20.56        | 20.66 | 20.38 | 25                        | 12     | 20.61        | 20.68 | 20.42 |
|                                         | 12   | 13     | 20.74        | 20.57 | 19.65 | 25                        | 25     | 20.81        | 20.62 | 19.78 |
|                                         | 25   | 0      | 20.52        | 20.47 | 20.67 | 50                        | 0      | 20.58        | 20.62 | 20.68 |

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UTTR-RF-FCC4G-V1.1

#### 4.5.7 LTE Band 66

| LTE Band 66 Maximum Average Power (dBm) |      |        |              |       |       |                           |        |              |       |       |
|-----------------------------------------|------|--------|--------------|-------|-------|---------------------------|--------|--------------|-------|-------|
| Modulation                              | RB   |        | Test Channel |       |       | RB                        |        | Test Channel |       |       |
|                                         | Size | Offset | Low          | Mid   | High  | Size                      | Offset | Low          | Mid   | High  |
| Channel Bandwidth: 1.4 MHz              |      |        |              |       |       | Channel Bandwidth: 3 MHz  |        |              |       |       |
| QPSK                                    | 1    | 0      | 22.68        | 22.71 | 22.41 | 1                         | 0      | 22.54        | 22.61 | 22.33 |
|                                         | 1    | 2      | 22.50        | 22.66 | 22.48 | 1                         | 7      | 22.44        | 22.59 | 22.43 |
|                                         | 1    | 5      | 22.71        | 22.43 | 22.42 | 1                         | 14     | 22.55        | 22.44 | 22.29 |
|                                         | 3    | 0      | 22.62        | 22.42 | 22.15 | 8                         | 0      | 21.52        | 21.41 | 21.25 |
|                                         | 3    | 1      | 22.54        | 22.35 | 22.32 | 8                         | 3      | 21.50        | 21.50 | 21.26 |
|                                         | 3    | 3      | 22.54        | 22.31 | 22.22 | 8                         | 7      | 21.42        | 21.41 | 21.36 |
| 16QAM                                   | 6    | 0      | 21.40        | 21.42 | 21.39 | 15                        | 0      | 21.39        | 21.28 | 21.34 |
|                                         | 1    | 0      | 21.67        | 21.37 | 21.64 | 1                         | 0      | 21.68        | 21.37 | 21.48 |
|                                         | 1    | 2      | 21.70        | 21.35 | 21.50 | 1                         | 7      | 21.62        | 21.41 | 21.48 |
|                                         | 1    | 5      | 21.60        | 21.44 | 21.47 | 1                         | 14     | 21.51        | 21.46 | 21.58 |
|                                         | 3    | 0      | 21.71        | 21.47 | 21.51 | 8                         | 0      | 20.60        | 20.58 | 20.50 |
|                                         | 3    | 1      | 21.72        | 21.50 | 21.47 | 8                         | 3      | 20.68        | 20.57 | 20.44 |
| 16QAM                                   | 3    | 3      | 21.66        | 21.51 | 21.52 | 8                         | 7      | 20.72        | 20.53 | 20.52 |
|                                         | 6    | 0      | 20.53        | 20.64 | 20.39 | 15                        | 0      | 20.66        | 20.47 | 20.49 |
| Channel Bandwidth: 5 MHz                |      |        |              |       |       | Channel Bandwidth: 10 MHz |        |              |       |       |
| QPSK                                    | 1    | 0      | 22.69        | 22.63 | 22.40 | 1                         | 0      | 22.63        | 22.65 | 22.45 |
|                                         | 1    | 12     | 22.55        | 22.49 | 22.48 | 1                         | 24     | 22.60        | 22.52 | 22.44 |
|                                         | 1    | 24     | 22.66        | 22.43 | 22.38 | 1                         | 49     | 22.62        | 22.59 | 22.36 |
|                                         | 12   | 0      | 21.45        | 21.37 | 21.26 | 25                        | 0      | 21.60        | 21.34 | 21.18 |
|                                         | 12   | 6      | 21.57        | 21.43 | 21.22 | 25                        | 12     | 21.51        | 21.43 | 21.25 |
|                                         | 12   | 13     | 21.59        | 21.35 | 21.25 | 25                        | 25     | 21.48        | 21.32 | 21.30 |
| 16QAM                                   | 25   | 0      | 21.49        | 21.32 | 21.33 | 50                        | 0      | 21.44        | 21.41 | 21.39 |
|                                         | 1    | 0      | 21.61        | 21.30 | 21.49 | 1                         | 0      | 21.56        | 21.39 | 21.66 |
|                                         | 1    | 12     | 21.52        | 21.45 | 21.56 | 1                         | 24     | 21.53        | 21.30 | 21.59 |
|                                         | 1    | 24     | 21.53        | 21.30 | 21.61 | 1                         | 49     | 21.51        | 21.29 | 21.58 |
|                                         | 12   | 0      | 20.70        | 20.62 | 20.41 | 25                        | 0      | 20.58        | 20.63 | 20.57 |
|                                         | 12   | 6      | 20.60        | 20.55 | 20.56 | 25                        | 12     | 20.69        | 20.59 | 20.40 |
| 16QAM                                   | 12   | 13     | 20.75        | 20.42 | 20.52 | 25                        | 25     | 20.68        | 20.55 | 20.41 |
|                                         | 25   | 0      | 20.63        | 20.52 | 20.51 | 50                        | 0      | 20.49        | 20.54 | 20.51 |
| Channel Bandwidth: 15 MHz               |      |        |              |       |       | Channel Bandwidth: 20 MHz |        |              |       |       |
| QPSK                                    | 1    | 0      | 22.62        | 22.70 | 22.40 | 1                         | 0      | 22.70        | 22.76 | 22.52 |
|                                         | 1    | 37     | 22.42        | 22.63 | 22.43 | 1                         | 50     | 22.62        | 22.67 | 22.54 |
|                                         | 1    | 74     | 22.73        | 22.59 | 22.35 | 1                         | 99     | 22.74        | 22.61 | 22.48 |
|                                         | 37   | 0      | 21.57        | 21.49 | 21.15 | 50                        | 0      | 21.65        | 21.53 | 21.31 |
|                                         | 37   | 19     | 21.49        | 21.45 | 21.32 | 50                        | 25     | 21.60        | 21.52 | 21.37 |
|                                         | 37   | 39     | 21.47        | 21.40 | 21.27 | 50                        | 50     | 21.62        | 21.47 | 21.39 |
| 16QAM                                   | 75   | 0      | 21.36        | 21.40 | 21.28 | 100                       | 0      | 21.55        | 21.44 | 21.40 |
|                                         | 1    | 0      | 21.54        | 21.38 | 21.61 | 1                         | 0      | 21.69        | 21.49 | 21.66 |
|                                         | 1    | 37     | 21.69        | 21.37 | 21.59 | 1                         | 50     | 21.71        | 21.48 | 21.63 |
|                                         | 1    | 74     | 21.65        | 21.34 | 21.53 | 1                         | 99     | 21.70        | 21.47 | 21.65 |
|                                         | 37   | 0      | 20.66        | 20.60 | 20.55 | 50                        | 0      | 20.76        | 20.67 | 20.61 |
|                                         | 37   | 19     | 20.56        | 20.57 | 20.44 | 50                        | 25     | 20.75        | 20.63 | 20.57 |
| 16QAM                                   | 37   | 39     | 20.74        | 20.59 | 20.50 | 50                        | 50     | 20.77        | 20.62 | 20.56 |
|                                         | 75   | 0      | 20.48        | 20.46 | 20.49 | 100                       | 0      | 20.68        | 20.65 | 20.56 |

## 5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

### 5.1 REFERENCE DOCUMENTS FOR TESTING

| No. | Identity           | Document Title                                                                                    |
|-----|--------------------|---------------------------------------------------------------------------------------------------|
| 1   | FCC 47 CFR Part 2  | Frequency allocations and radio treaty matters; general rules and regulations                     |
| 2   | FCC 47 CFR Part 22 | Public Mobile Services                                                                            |
| 3   | FCC 47 CFR Part 27 | Miscellaneous Wireless Communications Services                                                    |
| 4   | FCC 47 CFR Part 24 | Personal Communications Services                                                                  |
| 5   | FCC 47 CFR Part 90 | Private Land Mobile Radio Services                                                                |
| 6   | ANSI C63.26-2015   | American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services |
| 7   | KDB 971168 D01     | KDB 971168 D01 Power Meas License Digital Systems v03r01                                          |

### 5.2 ERP OR EIRP

**Test Requirement:** FCC 47 CFR Part 2.1046(a)  
**LTE Band 2:** FCC 47 CFR Part 24.232(c)  
**LTE Band 4 & LTE Band 66:** FCC 47 CFR Part 27.50(d)(4)  
**LTE Band 5:** FCC 47 CFR Part 22.913(a)  
**LTE Band 7:** FCC 47 CFR Part 27.50(h)(2)  
**LTE Band 12 & LTE Band 17:** FCC 47 CFR Part 27.50(c)(10)

**Test Method:** KDB 971168 D01v03r01 Section 5.6 & ANSI C63.26-2015

**Limit:**

**FCC 47 CFR Part 22.913(a):**

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

**FCC 47 CFR Part 24.232(c):**

Mobile and portable stations are limited to 2 watts EIRP.

**FCC 47 CFR Part 27.50(d)(4):**

Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

**FCC 47 CFR Part 27.50(c)(10):**

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

**FCC 47 CFR Part 27.50(h)(2):**

Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

1. Power is given in terms of effective radiated power (ERP).
2. Applicants in the Los Angeles, CA, area who demonstrate a need to serve both the downtown and fringe areas will be permitted to utilize an ERP of 1 kw at the following mountaintop sites: Santiago Park, Sierra Peak, Mount Lukens, and Mount Wilson.
3. Stations with antennas below 305 m (1,000 ft) (AAT) will be restricted to a maximum power of 1 kw (ERP).
4. Licensees in San Diego, CA, will be permitted to utilize an ERP of 500 watts at the following mountaintop sites: Palomar, Otay, Woodson and Miguel.

**Test Procedure:**

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_T - L_C$$

where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively  
(Expressed in the same units as P<sub>Meas</sub>, typically dBW or dBm);

P<sub>Meas</sub> = measured transmitter output power or PSD, in dBm or dBW;

G<sub>T</sub> = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

1) L<sub>C</sub> = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

**Test Setup:** Refer to section 4.2.1 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**Test Data:** See table below

### 5.2.1 LTE Band 2

| LTE Band 2 Maximum EIRP (dBm) |            |             |             |             |        |
|-------------------------------|------------|-------------|-------------|-------------|--------|
| Channel                       | QPSK; RB:1 | 16QAM; RB:1 | 64QAM; RB:1 | Limit (dBm) | Result |
| Channel Bandwidth: 1.4MHz     |            |             |             |             |        |
| Lowest                        | 20.20      | 19.17       | /           | 33.01       | Pass   |
| Middle                        | 20.05      | 19.11       | /           | 33.01       | Pass   |
| Highest                       | 20.05      | 19.26       | /           | 33.01       | Pass   |
| Channel Bandwidth: 3MHz       |            |             |             |             |        |
| Lowest                        | 20.04      | 19.04       | /           | 33.01       | Pass   |
| Middle                        | 20.03      | 19.13       | /           | 33.01       | Pass   |
| Highest                       | 20.00      | 19.15       | /           | 33.01       | Pass   |
| Channel Bandwidth: 5MHz       |            |             |             |             |        |
| Lowest                        | 20.16      | 19.00       | /           | 33.01       | Pass   |
| Middle                        | 20.02      | 19.10       | /           | 33.01       | Pass   |
| Highest                       | 20.05      | 19.18       | /           | 33.01       | Pass   |
| Channel Bandwidth: 10MHz      |            |             |             |             |        |
| Lowest                        | 20.16      | 18.98       | /           | 33.01       | Pass   |
| Middle                        | 20.18      | 18.96       | /           | 33.01       | Pass   |
| Highest                       | 20.01      | 19.28       | /           | 33.01       | Pass   |
| Channel Bandwidth: 15MHz      |            |             |             |             |        |
| Lowest                        | 20.22      | 19.12       | /           | 33.01       | Pass   |
| Middle                        | 20.18      | 19.02       | /           | 33.01       | Pass   |
| Highest                       | 20.00      | 19.23       | /           | 33.01       | Pass   |
| Channel Bandwidth: 20MHz      |            |             |             |             |        |
| Lowest                        | 20.23      | 19.17       | /           | 33.01       | Pass   |
| Middle                        | 20.20      | 19.14       | /           | 33.01       | Pass   |
| Highest                       | 20.11      | 19.28       | /           | 33.01       | Pass   |

### 5.2.2 LTE Band 4

| LTE Band 4 Maximum EIRP (dBm) |            |             |             |             |        |
|-------------------------------|------------|-------------|-------------|-------------|--------|
| Channel                       | QPSK; RB:1 | 16QAM; RB:1 | 64QAM; RB:1 | Limit (dBm) | Result |
| Channel Bandwidth: 1.4MHz     |            |             |             |             |        |
| Lowest                        | 20.95      | 19.98       | /           | 30.00       | Pass   |
| Middle                        | 20.82      | 19.81       | /           | 30.00       | Pass   |
| Highest                       | 20.84      | 19.77       | /           | 30.00       | Pass   |
| Channel Bandwidth: 3MHz       |            |             |             |             |        |
| Lowest                        | 20.81      | 19.99       | /           | 30.00       | Pass   |
| Middle                        | 20.72      | 19.87       | /           | 30.00       | Pass   |
| Highest                       | 20.79      | 19.64       | /           | 30.00       | Pass   |
| Channel Bandwidth: 5MHz       |            |             |             |             |        |
| Lowest                        | 20.96      | 19.92       | /           | 30.00       | Pass   |
| Middle                        | 20.74      | 19.91       | /           | 30.00       | Pass   |
| Highest                       | 20.84      | 19.67       | /           | 30.00       | Pass   |
| Channel Bandwidth: 10MHz      |            |             |             |             |        |
| Lowest                        | 20.90      | 19.88       | /           | 30.00       | Pass   |
| Middle                        | 20.76      | 19.76       | /           | 30.00       | Pass   |
| Highest                       | 20.80      | 19.68       | /           | 30.00       | Pass   |
| Channel Bandwidth: 15MHz      |            |             |             |             |        |
| Lowest                        | 20.90      | 20.02       | /           | 30.00       | Pass   |
| Middle                        | 20.81      | 19.83       | /           | 30.00       | Pass   |
| Highest                       | 20.79      | 19.63       | /           | 30.00       | Pass   |
| Channel Bandwidth: 20MHz      |            |             |             |             |        |
| Lowest                        | 20.97      | 20.07       | /           | 30.00       | Pass   |
| Middle                        | 20.87      | 19.94       | /           | 30.00       | Pass   |
| Highest                       | 20.90      | 19.71       | /           | 30.00       | Pass   |

### 5.2.3 LTE Band 5

| LTE Band 5 Maximum ERP (dBm) |            |             |             |             |        |
|------------------------------|------------|-------------|-------------|-------------|--------|
| Channel                      | QPSK; RB:1 | 16QAM; RB:1 | 64QAM; RB:1 | Limit (dBm) | Result |
| Channel Bandwidth: 1.4MHz    |            |             |             |             |        |
| Lowest                       | 18.50      | 17.91       | /           | 38.45       | Pass   |
| Middle                       | 18.32      | 17.76       | /           | 38.45       | Pass   |
| Highest                      | 18.33      | 17.88       | /           | 38.45       | Pass   |
| Channel Bandwidth: 3MHz      |            |             |             |             |        |
| Lowest                       | 18.47      | 17.72       | /           | 38.45       | Pass   |
| Middle                       | 18.34      | 17.33       | /           | 38.45       | Pass   |
| Highest                      | 18.23      | 17.32       | /           | 38.45       | Pass   |
| Channel Bandwidth: 5MHz      |            |             |             |             |        |
| Lowest                       | 18.45      | 17.73       | /           | 38.45       | Pass   |
| Middle                       | 18.40      | 17.33       | /           | 38.45       | Pass   |
| Highest                      | 18.33      | 17.31       | /           | 38.45       | Pass   |
| Channel Bandwidth: 10MHz     |            |             |             |             |        |
| Lowest                       | 18.52      | 17.78       | /           | 38.45       | Pass   |
| Middle                       | 18.49      | 17.47       | /           | 38.45       | Pass   |
| Highest                      | 18.43      | 17.33       | /           | 38.45       | Pass   |

### 5.2.4 LTE Band 7

| LTE Band 7 Maximum EIRP (dBm) |            |             |             |             |        |
|-------------------------------|------------|-------------|-------------|-------------|--------|
| Channel                       | QPSK; RB:1 | 16QAM; RB:1 | 64QAM; RB:1 | Limit (dBm) | Result |
| Channel Bandwidth: 5MHz       |            |             |             |             |        |
| Lowest                        | 21.21      | 20.28       | /           | 33.01       | Pass   |
| Middle                        | 21.06      | 20.45       | /           | 33.01       | Pass   |
| Highest                       | 21.01      | 20.39       | /           | 33.01       | Pass   |
| Channel Bandwidth: 10MHz      |            |             |             |             |        |
| Lowest                        | 21.20      | 20.25       | /           | 33.01       | Pass   |
| Middle                        | 21.13      | 20.46       | /           | 33.01       | Pass   |
| Highest                       | 21.11      | 20.29       | /           | 33.01       | Pass   |
| Channel Bandwidth: 15MHz      |            |             |             |             |        |
| Lowest                        | 21.25      | 20.27       | /           | 33.01       | Pass   |
| Middle                        | 21.03      | 20.50       | /           | 33.01       | Pass   |
| Highest                       | 21.08      | 20.33       | /           | 33.01       | Pass   |
| Channel Bandwidth: 20MHz      |            |             |             |             |        |
| Lowest                        | 21.25      | 20.32       | /           | 33.01       | Pass   |
| Middle                        | 21.14      | 20.56       | /           | 33.01       | Pass   |
| Highest                       | 21.17      | 20.41       | /           | 33.01       | Pass   |

### 5.2.5 LTE Band 12

| LTE Band 12 Maximum ERP (dBm) |            |             |             |             |        |
|-------------------------------|------------|-------------|-------------|-------------|--------|
| Channel                       | QPSK; RB:1 | 16QAM; RB:1 | 64QAM; RB:1 | Limit (dBm) | Result |
| Channel Bandwidth: 1.4MHz     |            |             |             |             |        |
| Lowest                        | 17.89      | 17.33       | /           | 34.77       | Pass   |
| Middle                        | 18.38      | 17.46       | /           | 34.77       | Pass   |
| Highest                       | 18.32      | 17.46       | /           | 34.77       | Pass   |
| Channel Bandwidth: 3MHz       |            |             |             |             |        |
| Lowest                        | 17.81      | 16.98       | /           | 34.77       | Pass   |
| Middle                        | 17.93      | 16.99       | /           | 34.77       | Pass   |
| Highest                       | 17.74      | 17.43       | /           | 34.77       | Pass   |
| Channel Bandwidth: 5MHz       |            |             |             |             |        |
| Lowest                        | 17.83      | 16.99       | /           | 34.77       | Pass   |
| Middle                        | 18.00      | 17.02       | /           | 34.77       | Pass   |
| Highest                       | 17.88      | 17.32       | /           | 34.77       | Pass   |
| Channel Bandwidth: 10MHz      |            |             |             |             |        |
| Lowest                        | 17.99      | 17.11       | /           | 34.77       | Pass   |
| Middle                        | 18.03      | 17.04       | /           | 34.77       | Pass   |
| Highest                       | 17.92      | 17.48       | /           | 34.77       | Pass   |

### 5.2.6 LTE Band 17

| LTE Band 17 Maximum ERP (dBm) |            |             |             |             |        |
|-------------------------------|------------|-------------|-------------|-------------|--------|
| Channel                       | QPSK; RB:1 | 16QAM; RB:1 | 64QAM; RB:1 | Limit (dBm) | Result |
| Channel Bandwidth: 5MHz       |            |             |             |             |        |
| Lowest                        | 17.88      | 16.96       | /           | 34.77       | Pass   |
| Middle                        | 17.91      | 17.45       | /           | 34.77       | Pass   |
| Highest                       | 17.85      | 17.58       | /           | 34.77       | Pass   |
| Channel Bandwidth: 10MHz      |            |             |             |             |        |
| Lowest                        | 17.91      | 17.03       | /           | 34.77       | Pass   |
| Middle                        | 18.07      | 17.49       | /           | 34.77       | Pass   |
| Highest                       | 17.93      | 17.68       | /           | 34.77       | Pass   |

### 5.2.7 LTE Band 66

| LTE Band 66 Maximum EIRP (dBm) |            |             |             |             |        |
|--------------------------------|------------|-------------|-------------|-------------|--------|
| Channel                        | QPSK; RB:1 | 16QAM; RB:1 | 64QAM; RB:1 | Limit (dBm) | Result |
| Channel Bandwidth: 1.4MHz      |            |             |             |             |        |
| Lowest                         | 20.71      | 19.72       | /           | 30.00       | Pass   |
| Middle                         | 20.71      | 19.51       | /           | 30.00       | Pass   |
| Highest                        | 20.48      | 19.64       | /           | 30.00       | Pass   |
| Channel Bandwidth: 3MHz        |            |             |             |             |        |
| Lowest                         | 20.55      | 19.68       | /           | 30.00       | Pass   |
| Middle                         | 20.61      | 19.46       | /           | 30.00       | Pass   |
| Highest                        | 20.43      | 19.58       | /           | 30.00       | Pass   |
| Channel Bandwidth: 5MHz        |            |             |             |             |        |
| Lowest                         | 20.69      | 19.61       | /           | 30.00       | Pass   |
| Middle                         | 20.63      | 19.45       | /           | 30.00       | Pass   |
| Highest                        | 20.48      | 19.61       | /           | 30.00       | Pass   |
| Channel Bandwidth: 10MHz       |            |             |             |             |        |
| Lowest                         | 20.63      | 19.56       | /           | 30.00       | Pass   |
| Middle                         | 20.65      | 19.39       | /           | 30.00       | Pass   |
| Highest                        | 20.45      | 19.66       | /           | 30.00       | Pass   |
| Channel Bandwidth: 15MHz       |            |             |             |             |        |
| Lowest                         | 20.73      | 19.69       | /           | 30.00       | Pass   |
| Middle                         | 20.70      | 19.38       | /           | 30.00       | Pass   |
| Highest                        | 20.43      | 19.61       | /           | 30.00       | Pass   |
| Channel Bandwidth: 20MHz       |            |             |             |             |        |
| Lowest                         | 20.74      | 19.71       | /           | 30.00       | Pass   |
| Middle                         | 20.76      | 19.49       | /           | 30.00       | Pass   |
| Highest                        | 20.54      | 19.66       | /           | 30.00       | Pass   |

### 5.3 CONDUCTED OUTPUT POWER

**Test Requirement:** FCC 47 CFR Part 2.1046(a)  
LTE Band 2: FCC 47 CFR Part 24.232(c)  
LTE Band 4: FCC 47 CFR Part 27.50(d)(4)  
LTE Band 5: FCC 47 CFR Part 22.913(a)  
LTE Band 7: FCC 47 CFR Part 27.50(h)(2)  
LTE Band 12 & Band 17: FCC 47 CFR Part 27.50(c)(10)  
**Test Method:** KDB 971168 D01v03r01 & ANSI C63.26-2015  
**Limit:**  
**FCC 47 CFR Part 22.913(a):**  
The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

**FCC 47 CFR Part 24.232(c):**  
Mobile and portable stations are limited to 2 watts EIRP.

**FCC 47 CFR Part 27.50(d)(4):**  
Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

**FCC 47 CFR Part 27.50(c)(10):**  
Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

**FCC 47 CFR Part 27.50(h)(2):**  
Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

1. Power is given in terms of effective radiated power (ERP).
2. Applicants in the Los Angeles, CA, area who demonstrate a need to serve both the downtown and fringe areas will be permitted to utilize an ERP of 1 kw at the following mountaintop sites: Santiago Park, Sierra Peak, Mount Lukens, and Mount Wilson.
3. Stations with antennas below 305 m (1,000 ft) (AAT) will be restricted to a maximum power of 1 kw (ERP).
4. Licensees in San Diego, CA, will be permitted to utilize an ERP of 500 watts at the following mountaintop sites: Palomar, Otay, Woodson and Miguel.

**Test Procedure:**  
The EUT was set up for the maximum power with LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

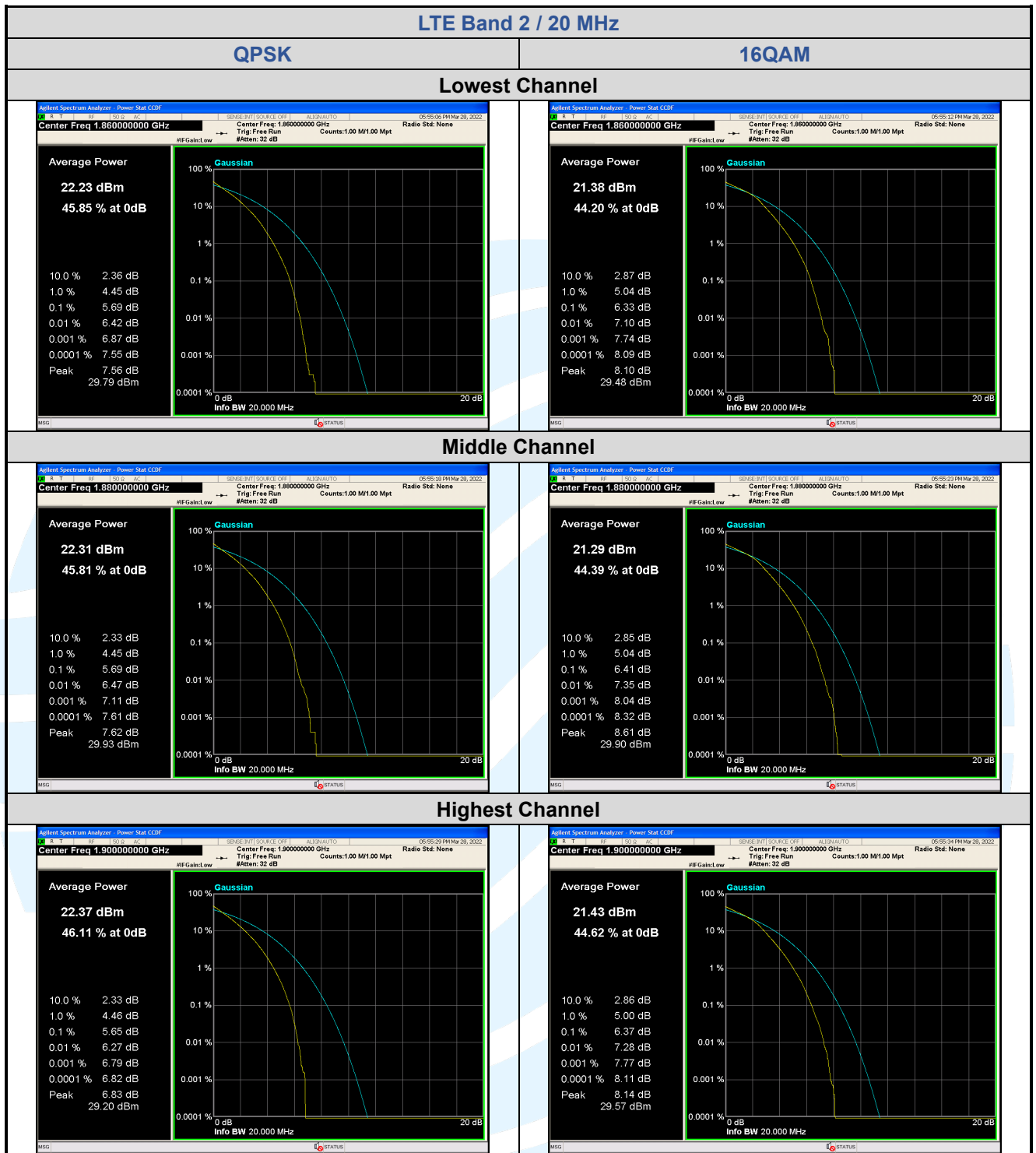
**Test Data:** [The full result refer to section 4.5 for details.](#)

## 5.4 PEAK-TO-AVERAGE RATIO

|                                                                                                  |                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Test Requirement:</b>                                                                         | <b>LTE Band 2:</b> FCC 47 CFR Part 24.232(d)                                                                                                       |
|                                                                                                  | <b>LTE Band 4 &amp; LTE Band 66:</b> FCC 47 CFR Part 27.50(d)(5)                                                                                   |
|                                                                                                  | <b>LTE Band 5:</b> FCC 47 CFR Part 22.913(a)                                                                                                       |
|                                                                                                  | <b>LTE Band 7:</b> FCC 47 CFR Part 27.50(d)(5)                                                                                                     |
|                                                                                                  | <b>LTE Band 12 &amp; Band 17:</b> FCC 47 CFR Part 27.50(d)(5)                                                                                      |
| <b>Test Method:</b>                                                                              | KDB 971168 D01v03r01 Section 5.7                                                                                                                   |
| <b>Limit:</b>                                                                                    | In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB |
| <b>Test Procedure:</b>                                                                           | The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.       |
|                                                                                                  | a) Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth                                                                         |
|                                                                                                  | b) Set the number of counts to a value that stabilizes the measured CCDF curve                                                                     |
|                                                                                                  | c) Record the maximum PAPR level associated with a probability of 0.1 %                                                                            |
| Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset. |                                                                                                                                                    |
| <b>Test Setup:</b>                                                                               | Refer to section 4.2.2 for details.                                                                                                                |
| <b>Instruments Used:</b>                                                                         | Refer to section 3 for details                                                                                                                     |
| <b>Test Mode:</b>                                                                                | Link mode                                                                                                                                          |
| <b>Test Results:</b>                                                                             | Pass                                                                                                                                               |
| <b>Test Data:</b>                                                                                | See table below                                                                                                                                    |

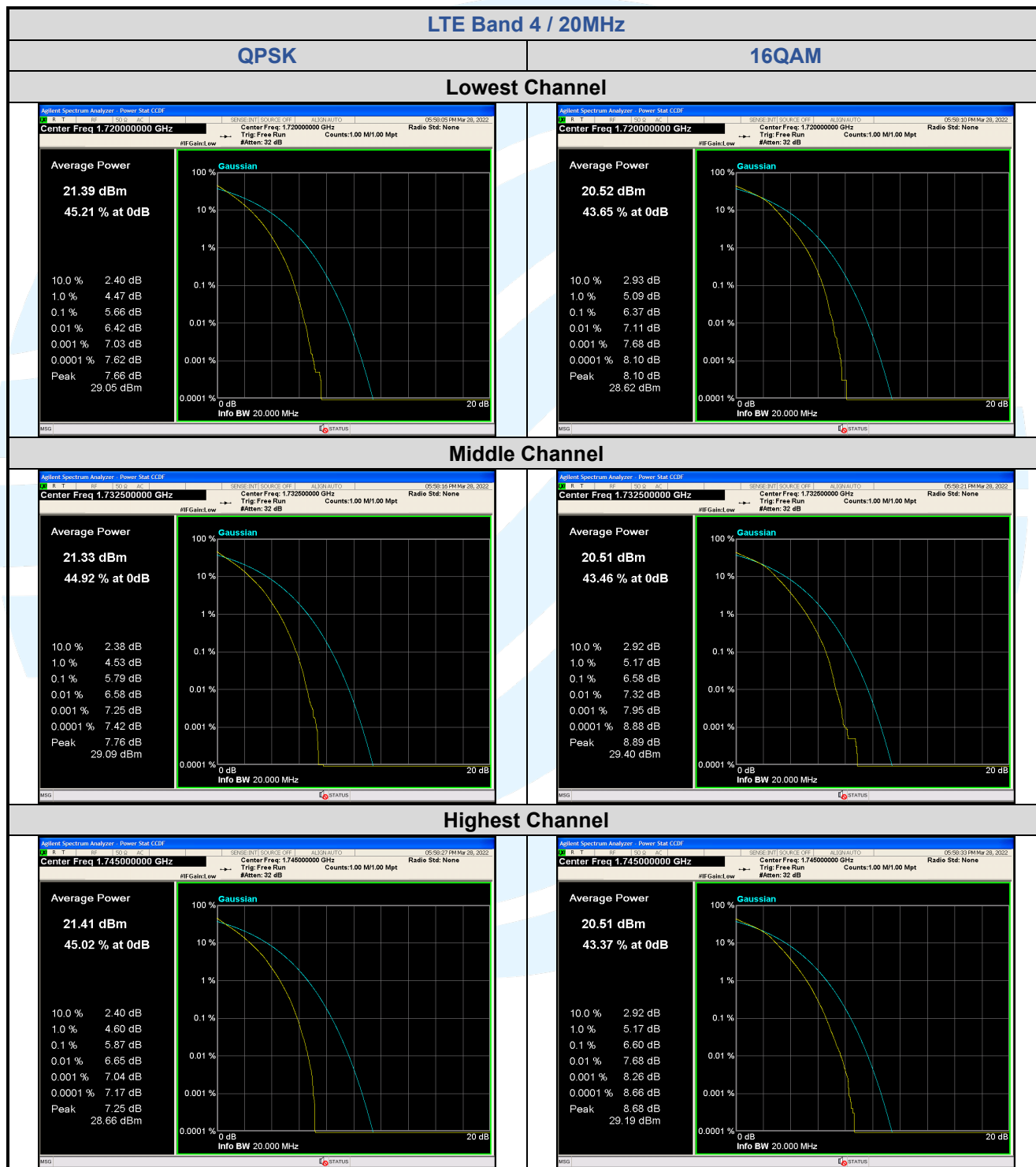
### 5.4.1 LTE Band 2

| LTE Band 2 Peak-to-average ratio (dB) |                  |                           |       |       |            |        |
|---------------------------------------|------------------|---------------------------|-------|-------|------------|--------|
| Channel                               | RB Configuration | Channel Bandwidth: 20 MHz |       |       | Limit (dB) | Result |
|                                       |                  | QPSK                      | 16QAM | 64QAM |            |        |
| Lowest                                | Full RB          | 5.69                      | 6.33  | /     | 13         | Pass   |
| Middle                                | Full RB          | 5.69                      | 6.41  | /     | 13         | Pass   |
| Highest                               | Full RB          | 5.65                      | 6.37  | /     | 13         | Pass   |



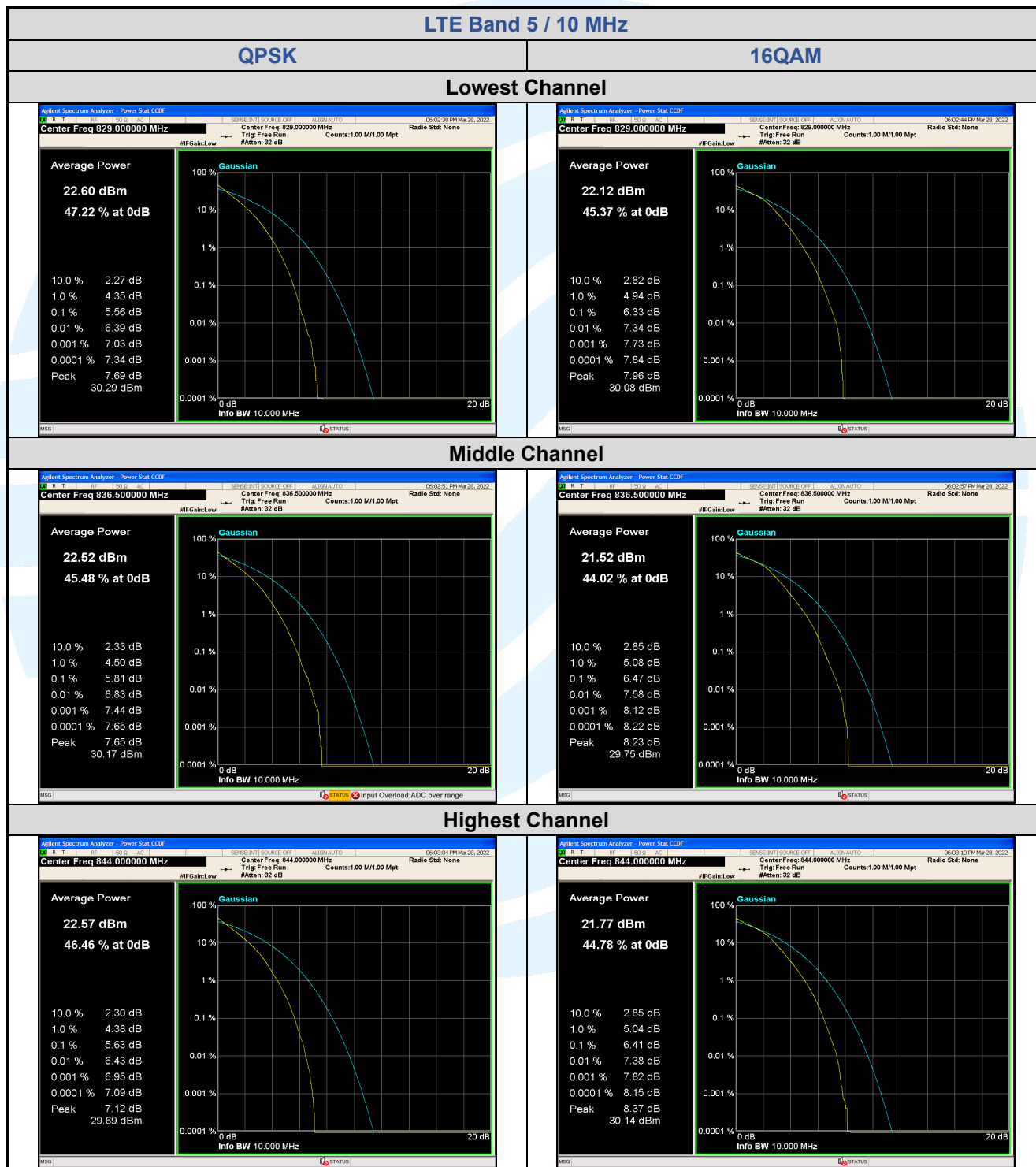
### 5.4.2 LTE Band 4

| LTE Band 4 Peak-to-average ratio (dB) |                  |                           |       |       |            |        |
|---------------------------------------|------------------|---------------------------|-------|-------|------------|--------|
| Channel                               | RB Configuration | Channel Bandwidth: 20 MHz |       |       | Limit (dB) | Result |
|                                       |                  | QPSK                      | 16QAM | 64QAM |            |        |
| Lowest                                | Full RB          | 5.66                      | 6.37  | /     | 13         | Pass   |
| Middle                                | Full RB          | 5.79                      | 6.58  | /     | 13         | Pass   |
| Highest                               | Full RB          | 5.87                      | 6.60  | /     | 13         | Pass   |



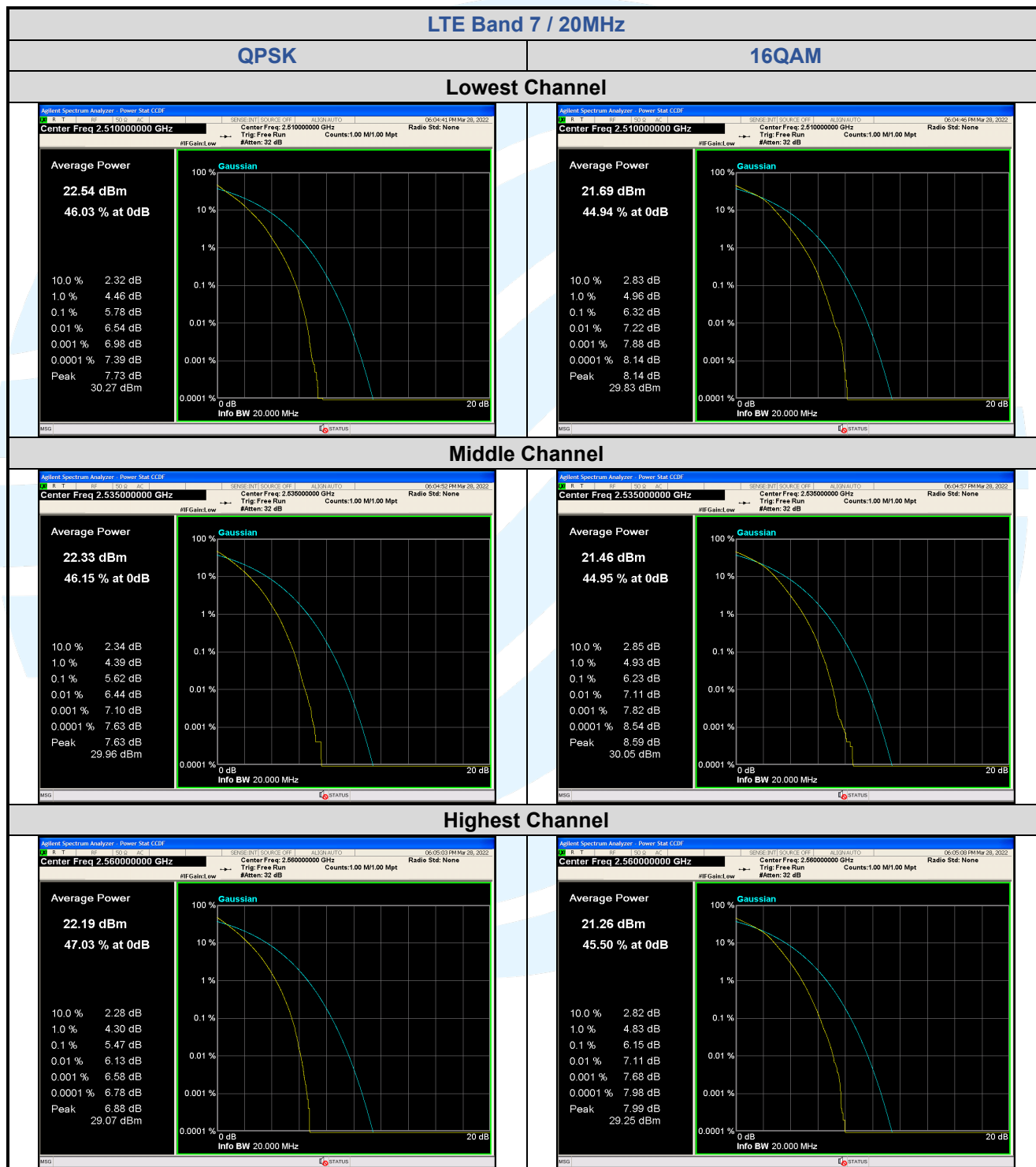
### 5.4.3 LTE Band 5

| LTE Band 5 Peak-to-average ratio (dB) |                  |                           |       |       |            |        |
|---------------------------------------|------------------|---------------------------|-------|-------|------------|--------|
| Channel                               | RB Configuration | Channel Bandwidth: 10 MHz |       |       | Limit (dB) | Result |
|                                       |                  | QPSK                      | 16QAM | 64QAM |            |        |
| Lowest                                | Full RB          | 5.56                      | 6.33  | /     | 13         | Pass   |
| Middle                                | Full RB          | 5.81                      | 6.47  | /     | 13         | Pass   |
| Highest                               | Full RB          | 5.63                      | 6.41  | /     | 13         | Pass   |



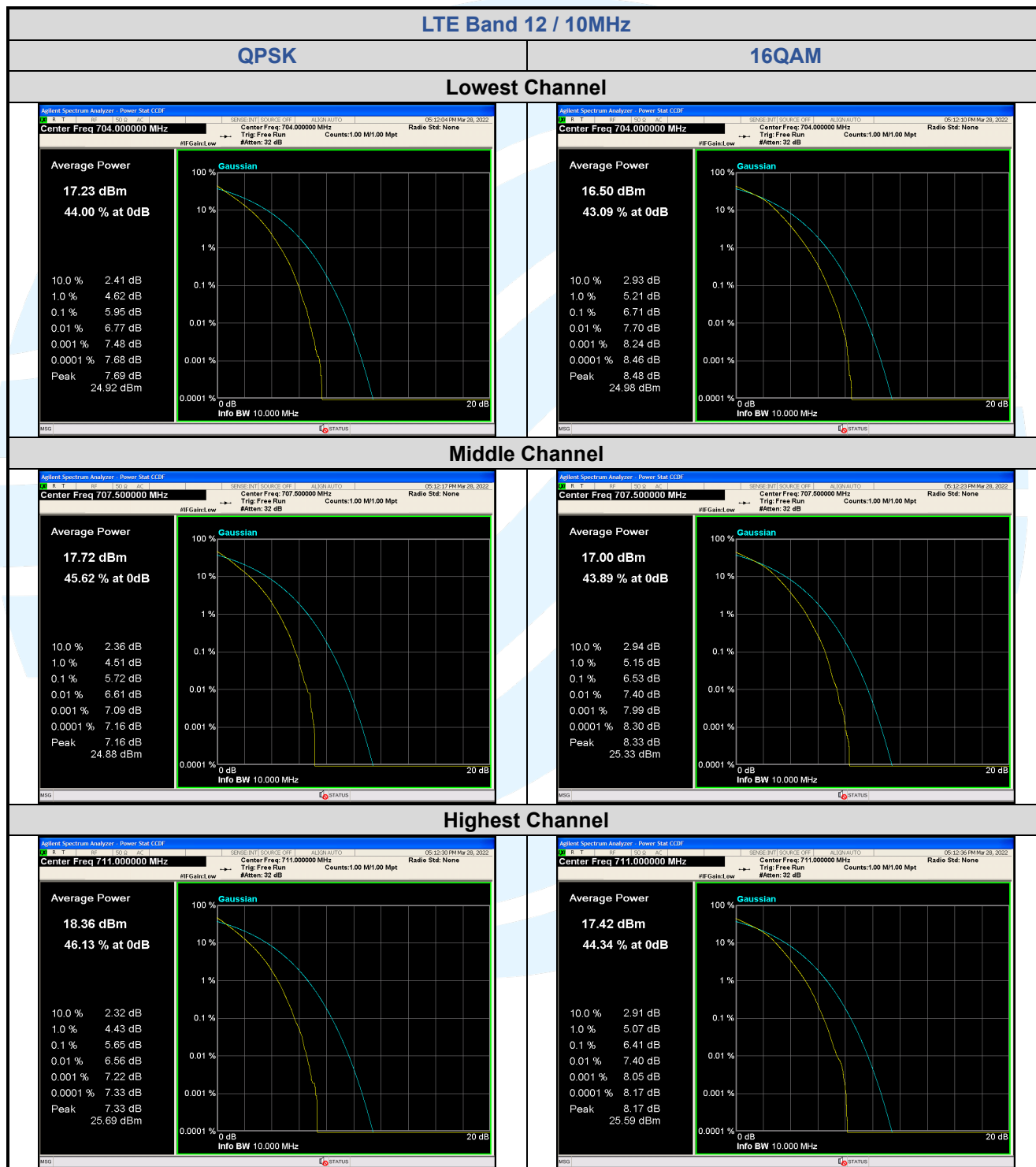
### 5.4.4 LTE Band 7

| LTE Band 7 Peak-to-average ratio (dB) |                  |                           |       |       |            |        |
|---------------------------------------|------------------|---------------------------|-------|-------|------------|--------|
| Channel                               | RB Configuration | Channel Bandwidth: 20 MHz |       |       | Limit (dB) | Result |
|                                       |                  | QPSK                      | 16QAM | 64QAM |            |        |
| Lowest                                | Full RB          | 5.78                      | 6.32  | /     | 13         | Pass   |
| Middle                                | Full RB          | 5.62                      | 6.23  | /     | 13         | Pass   |
| Highest                               | Full RB          | 5.47                      | 6.15  | /     | 13         | Pass   |



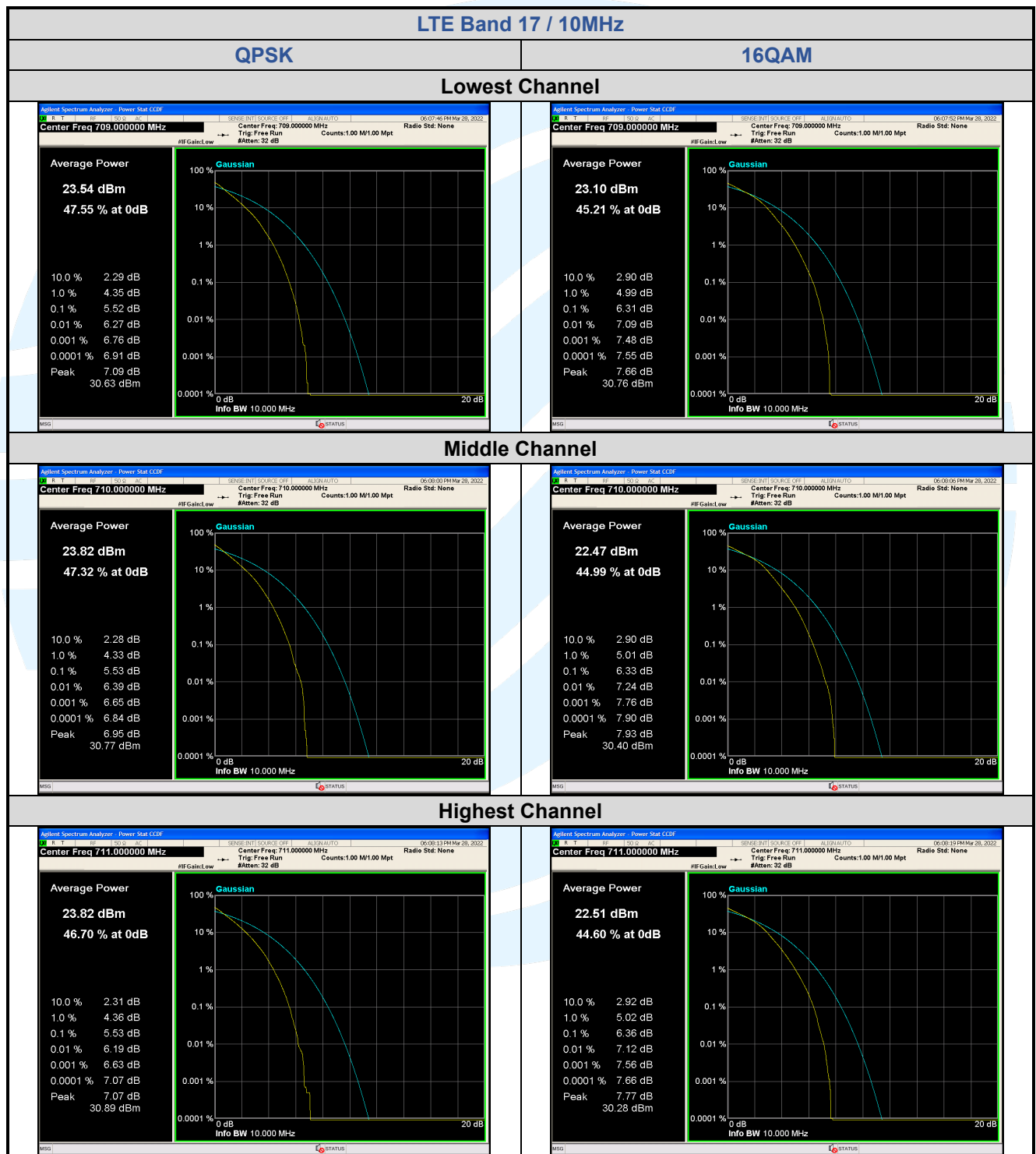
### 5.4.5 LTE Band 12

| LTE Band 12 Peak-to-average ratio (dB) |                  |                           |       |       |            |        |
|----------------------------------------|------------------|---------------------------|-------|-------|------------|--------|
| Channel                                | RB Configuration | Channel Bandwidth: 10 MHz |       |       | Limit (dB) | Result |
|                                        |                  | QPSK                      | 16QAM | 64QAM |            |        |
| Lowest                                 | Full RB          | 5.95                      | 6.71  | /     | 13         | Pass   |
| Middle                                 | Full RB          | 5.72                      | 6.53  | /     | 13         | Pass   |
| Highest                                | Full RB          | 5.65                      | 6.41  | /     | 13         | Pass   |



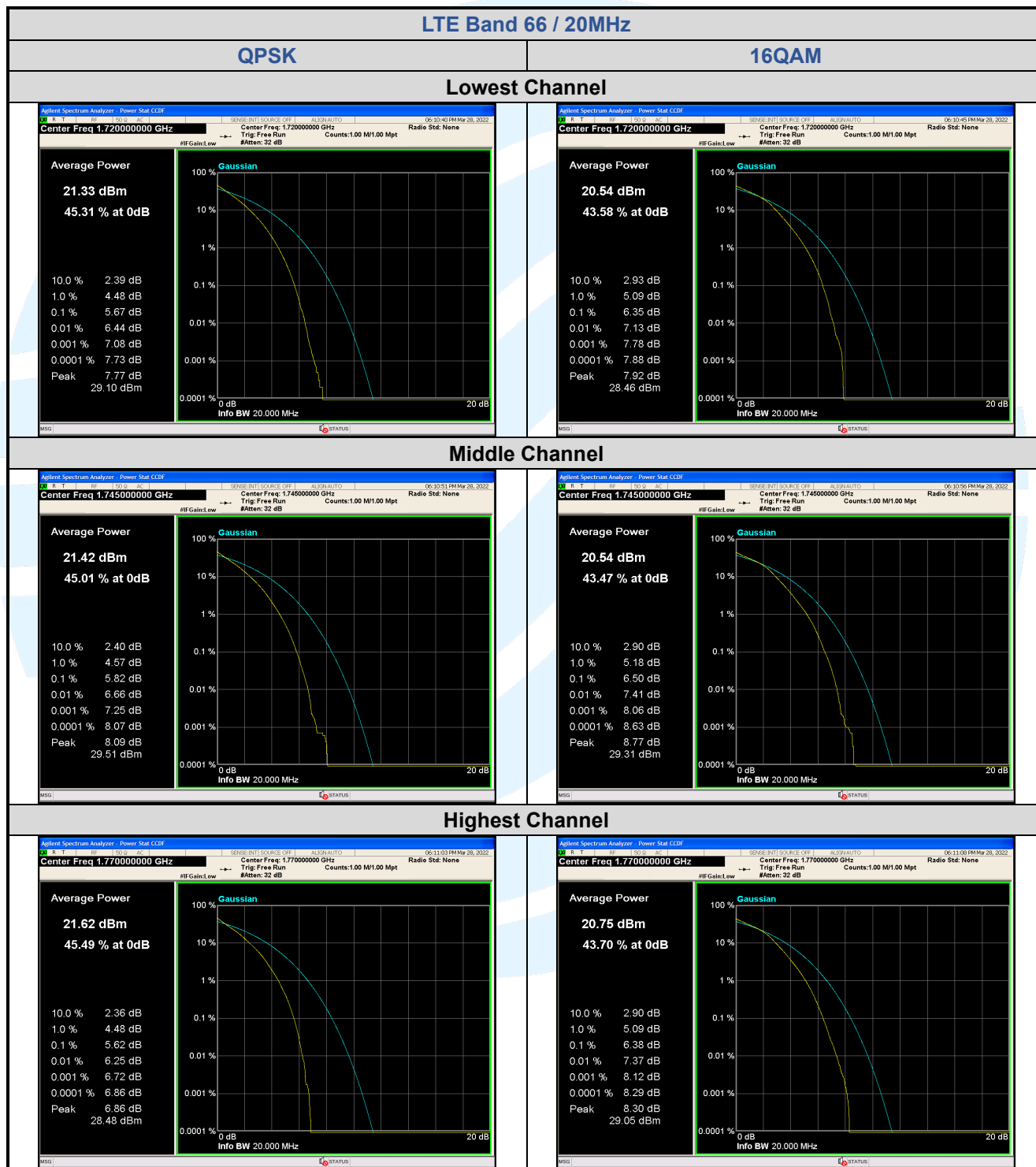
### 5.4.6 LTE Band 17

| LTE Band 17 Peak-to-average ratio (dB) |                  |                           |       |       |            |        |
|----------------------------------------|------------------|---------------------------|-------|-------|------------|--------|
| Channel                                | RB Configuration | Channel Bandwidth: 10 MHz |       |       | Limit (dB) | Result |
|                                        |                  | QPSK                      | 16QAM | 64QAM |            |        |
| Lowest                                 | Full RB          | 5.52                      | 6.31  | /     | 13         | Pass   |
| Middle                                 | Full RB          | 5.53                      | 6.33  | /     | 13         | Pass   |
| Highest                                | Full RB          | 5.53                      | 6.36  | /     | 13         | Pass   |



### 5.4.7 LTE Band 66

| LTE Band 66 Peak-to-average ratio (dB) |                  |                           |       |       |            |        |
|----------------------------------------|------------------|---------------------------|-------|-------|------------|--------|
| Channel                                | RB Configuration | Channel Bandwidth: 20 MHz |       |       | Limit (dB) | Result |
|                                        |                  | QPSK                      | 16QAM | 64QAM |            |        |
| Lowest                                 | Full RB          | 5.67                      | 6.35  | /     | 13         | Pass   |
| Middle                                 | Full RB          | 5.82                      | 6.50  | /     | 13         | Pass   |
| Highest                                | Full RB          | 5.62                      | 6.38  | /     | 13         | Pass   |



## 5.599%&26DB BANDWIDTH

**Test Requirement:** FCC 47 CFR Part 2.1049(h)

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01 Section 4

**Limit:** No Limit, for reporting purposes only.

**Test Procedure:**

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Link mode

**Test Results:** Pass

**Test Data:** See table below

### 5.5.1 LTE Band 2

| LTE Band 2                 |                  |        |              |       |       |                |       |       |
|----------------------------|------------------|--------|--------------|-------|-------|----------------|-------|-------|
| Channel                    | RB Configuration |        | 99% BW (MHz) |       |       | 26 dB BW (MHz) |       |       |
|                            | Size             | Offset | QPSK         | 16QAM | 64QAM | QPSK           | 16QAM | 64QAM |
| Channel Bandwidth: 1.4 MHz |                  |        |              |       |       |                |       |       |
| Lowest                     | 6                | 0      | 1.09         | 1.10  | /     | 1.23           | 1.25  | /     |
| Middle                     | 6                | 0      | 1.09         | 1.09  | /     | 1.25           | 1.24  | /     |
| Highest                    | 6                | 0      | 1.09         | 1.09  | /     | 1.24           | 1.24  | /     |
| Channel Bandwidth: 3 MHz   |                  |        |              |       |       |                |       |       |
| Lowest                     | 15               | 0      | 2.70         | 2.71  | /     | 3.03           | 3.04  | /     |
| Middle                     | 15               | 0      | 2.71         | 2.71  | /     | 3.02           | 3.03  | /     |
| Highest                    | 15               | 0      | 2.72         | 2.71  | /     | 3.05           | 3.04  | /     |
| Channel Bandwidth: 5 MHz   |                  |        |              |       |       |                |       |       |
| Lowest                     | 25               | 0      | 4.50         | 4.52  | /     | 4.96           | 4.98  | /     |
| Middle                     | 25               | 0      | 4.50         | 4.50  | /     | 4.95           | 4.98  | /     |
| Highest                    | 25               | 0      | 4.51         | 4.50  | /     | 4.96           | 4.99  | /     |
| Channel Bandwidth: 10 MHz  |                  |        |              |       |       |                |       |       |
| Lowest                     | 50               | 0      | 9.00         | 8.99  | /     | 9.90           | 9.83  | /     |
| Middle                     | 50               | 0      | 8.96         | 8.97  | /     | 9.88           | 9.88  | /     |
| Highest                    | 50               | 0      | 8.98         | 9.00  | /     | 9.84           | 9.89  | /     |
| Channel Bandwidth: 15 MHz  |                  |        |              |       |       |                |       |       |
| Lowest                     | 75               | 0      | 13.47        | 13.48 | /     | 14.92          | 14.73 | /     |
| Middle                     | 75               | 0      | 13.47        | 13.48 | /     | 14.80          | 14.81 | /     |
| Highest                    | 75               | 0      | 13.46        | 13.51 | /     | 14.85          | 14.81 | /     |
| Channel Bandwidth: 20 MHz  |                  |        |              |       |       |                |       |       |
| Lowest                     | 100              | 0      | 17.93        | 18.00 | /     | 19.64          | 19.68 | /     |
| Middle                     | 100              | 0      | 17.98        | 17.96 | /     | 19.68          | 19.77 | /     |
| Highest                    | 100              | 0      | 18.00        | 17.94 | /     | 19.77          | 19.73 | /     |

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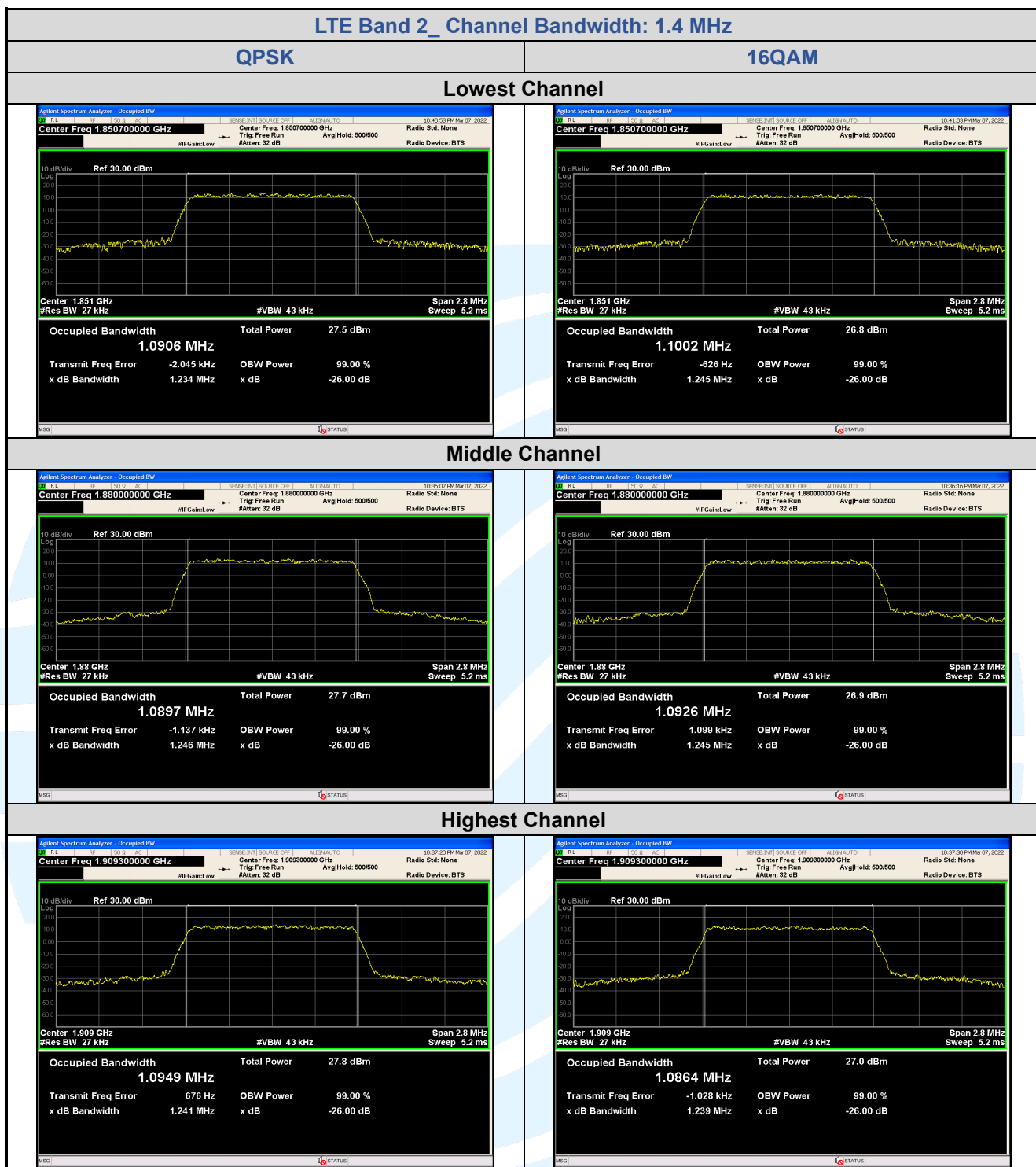
Tel: +86-755-28230888

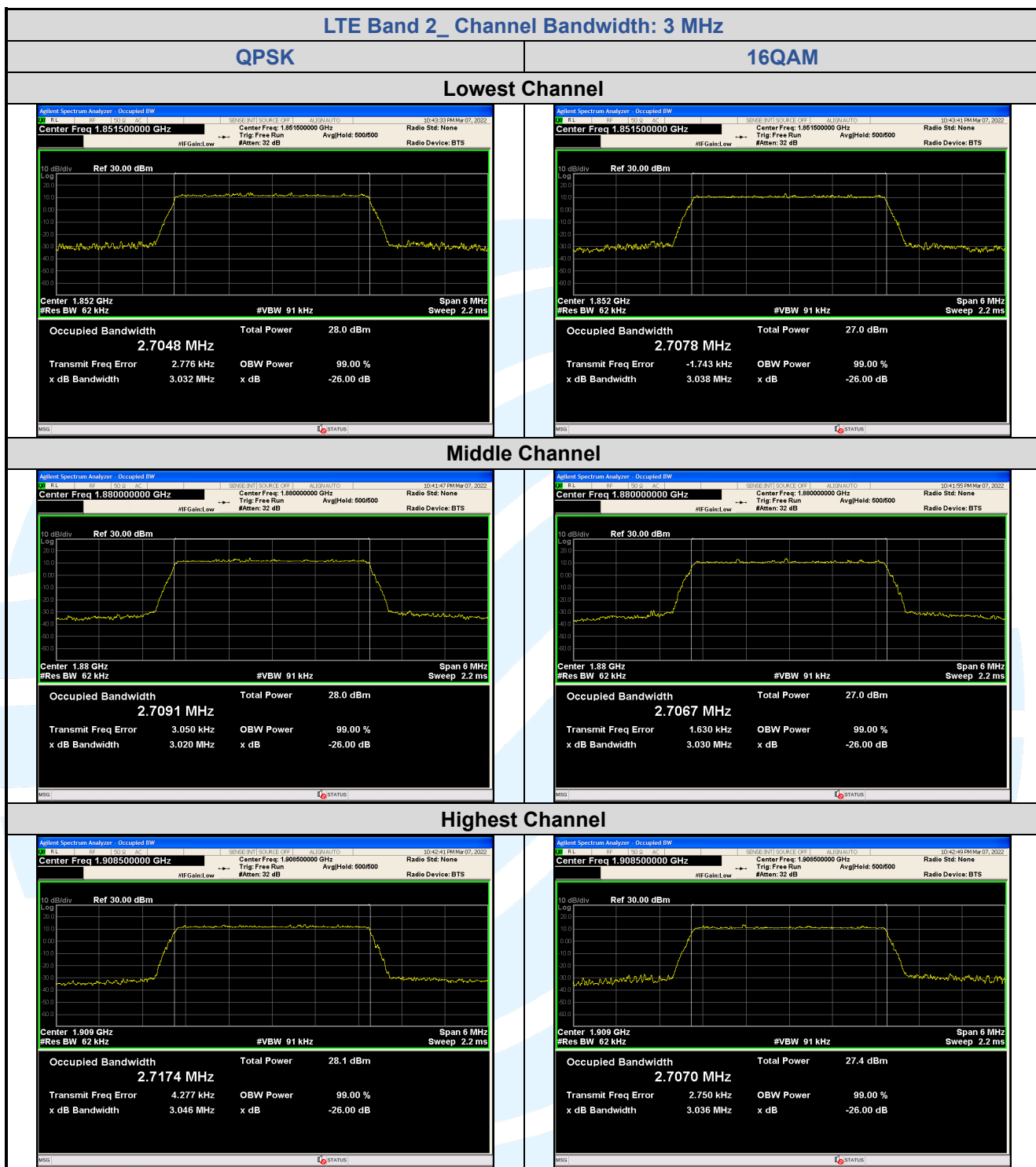
Fax: +86-755-28230886

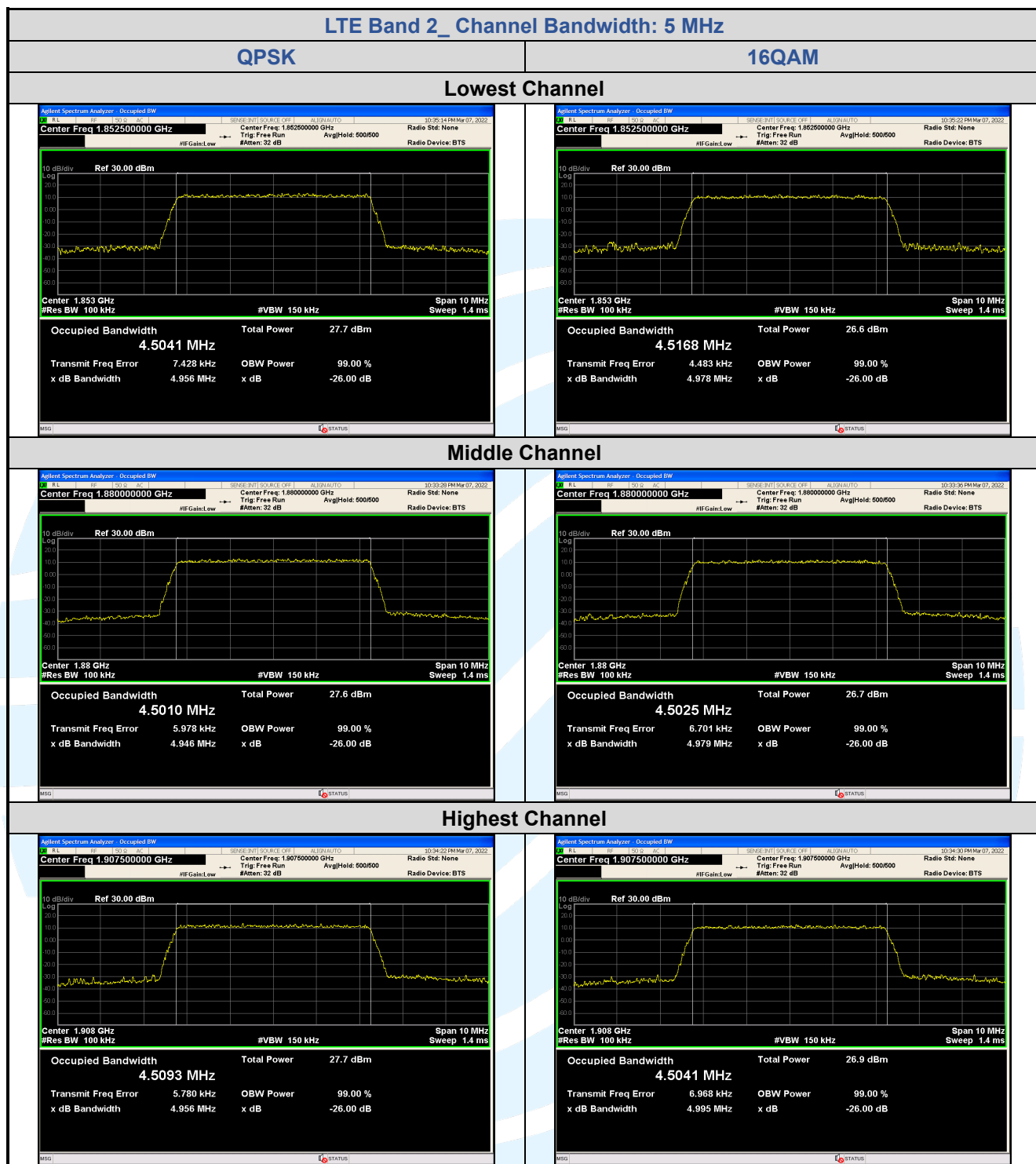
E-mail: info@uttlab.com

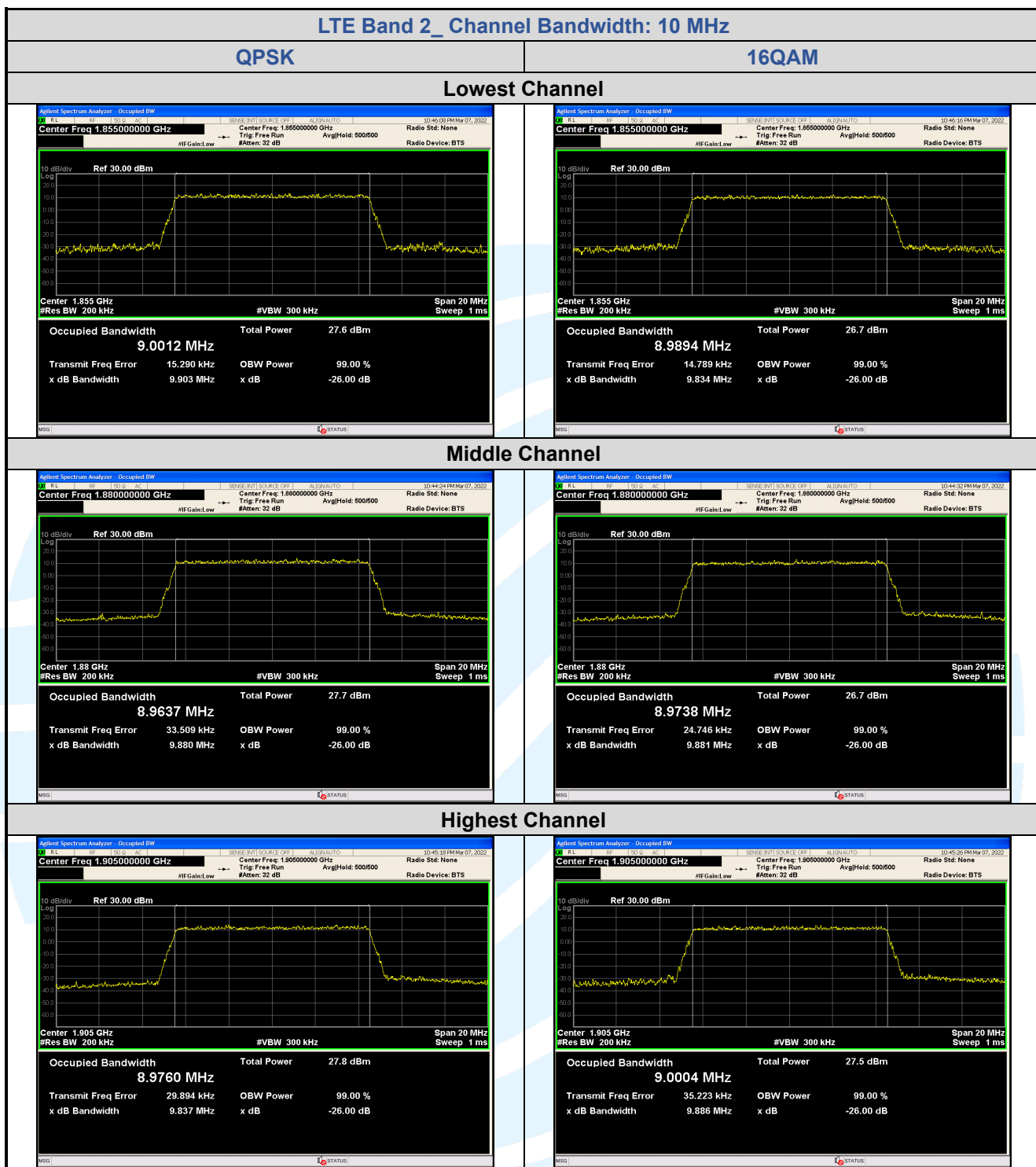
<http://www.uttlab.com>

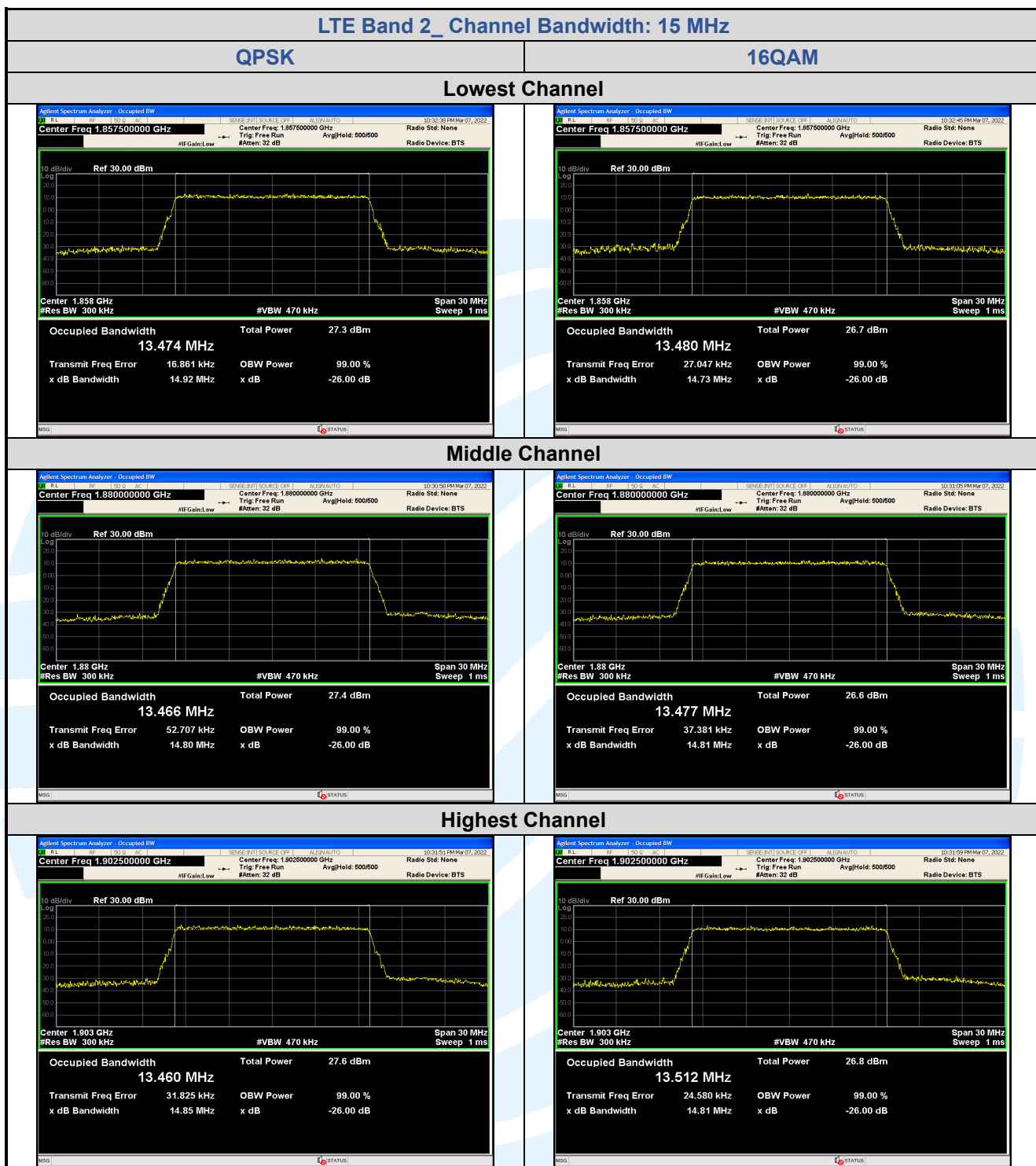
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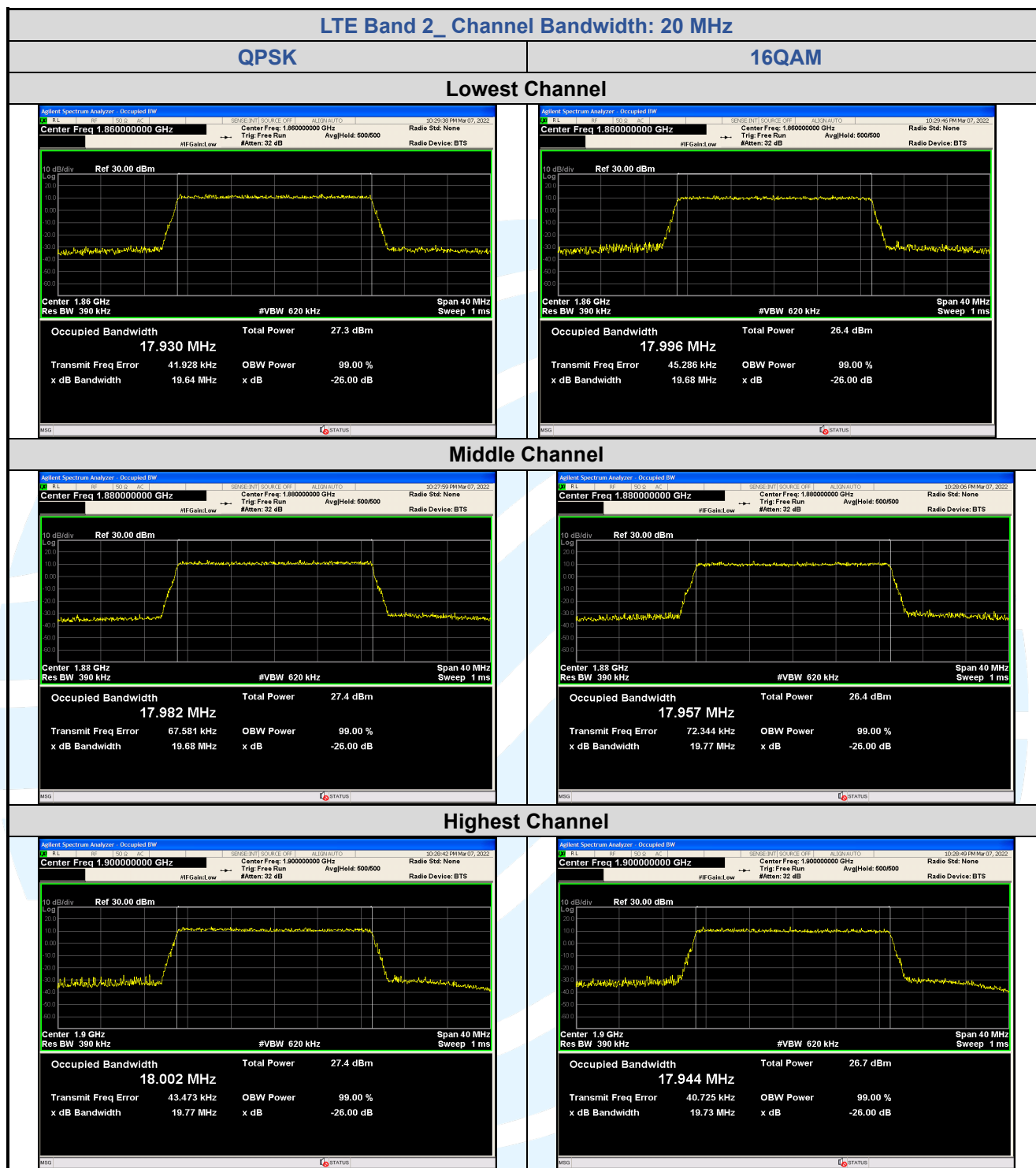












### 5.5.2 LTE Band 4

| LTE Band 4                 |                  |        |              |       |       |                |       |       |
|----------------------------|------------------|--------|--------------|-------|-------|----------------|-------|-------|
| Channel                    | RB Configuration |        | 99% BW (MHz) |       |       | 26 dB BW (MHz) |       |       |
|                            | Size             | Offset | QPSK         | 16QAM | 64QAM | QPSK           | 16QAM | 64QAM |
| Channel Bandwidth: 1.4 MHz |                  |        |              |       |       |                |       |       |
| Lowest                     | 6                | 0      | 1.09         | 1.10  | /     | 1.24           | 1.24  | /     |
| Middle                     | 6                | 0      | 1.09         | 1.09  | /     | 1.24           | 1.24  | /     |
| Highest                    | 6                | 0      | 1.09         | 1.10  | /     | 1.24           | 1.24  | /     |
| Channel Bandwidth: 3 MHz   |                  |        |              |       |       |                |       |       |
| Lowest                     | 15               | 0      | 2.71         | 2.71  | /     | 3.03           | 3.04  | /     |
| Middle                     | 15               | 0      | 2.71         | 2.70  | /     | 3.03           | 3.04  | /     |
| Highest                    | 15               | 0      | 2.72         | 2.71  | /     | 3.06           | 3.03  | /     |
| Channel Bandwidth: 5 MHz   |                  |        |              |       |       |                |       |       |
| Lowest                     | 25               | 0      | 4.49         | 4.52  | /     | 4.94           | 4.98  | /     |
| Middle                     | 25               | 0      | 4.51         | 4.52  | /     | 4.95           | 4.97  | /     |
| Highest                    | 25               | 0      | 4.51         | 4.52  | /     | 4.99           | 5.00  | /     |
| Channel Bandwidth: 10 MHz  |                  |        |              |       |       |                |       |       |
| Lowest                     | 50               | 0      | 8.99         | 8.97  | /     | 9.82           | 9.75  | /     |
| Middle                     | 50               | 0      | 8.99         | 9.00  | /     | 9.88           | 9.93  | /     |
| Highest                    | 50               | 0      | 9.00         | 8.99  | /     | 9.82           | 9.81  | /     |
| Channel Bandwidth: 15 MHz  |                  |        |              |       |       |                |       |       |
| Lowest                     | 75               | 0      | 13.47        | 13.46 | /     | 14.78          | 14.81 | /     |
| Middle                     | 75               | 0      | 13.47        | 13.46 | /     | 14.80          | 14.89 | /     |
| Highest                    | 75               | 0      | 13.49        | 13.45 | /     | 14.84          | 14.70 | /     |
| Channel Bandwidth: 20 MHz  |                  |        |              |       |       |                |       |       |
| Lowest                     | 100              | 0      | 17.92        | 17.94 | /     | 19.58          | 19.45 | /     |
| Middle                     | 100              | 0      | 17.99        | 17.95 | /     | 19.66          | 19.53 | /     |
| Highest                    | 100              | 0      | 18.00        | 17.99 | /     | 19.64          | 19.54 | /     |